

Pass cards

ACCA Paper F2  
Management Accounting



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Welcome to BPP's ACCA **Passcards** for Paper F2 Management Accounting.

- They **focus on your exam** and **save you time**.
- They incorporate **diagrams** to kick start your memory.
- They follow the overall **structure** of the BPP Study Texts, but BPP's ACCA **Passcards** are not just a condensed book. Each card has been separately designed for clear presentation. Topics are self contained and can be grasped visually.
- ACCA **Passcards** are still **just the right size** for pockets, briefcases and bags.
- ACCA **Passcards** should be used in conjunction with the revision plan in the front pages of the kit. The plan identifies key questions for you to try in the kit.

Run through the **Passcards** as often as you can during your final revision period. The day before the exam, try to go through the **Passcards** again! You will then be well on your way to passing your exams.

**Good luck!**

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# 1: Information for management

## Topic List

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Planning, control and decision making

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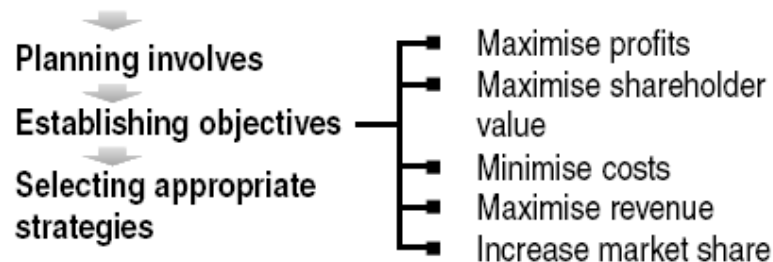
Financial and management accounting

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*Data is the raw material for data processing. Information is data that has been processed in such a way as to make it meaningful to its user. Management information is the information used by management to run an organisation. Some qualities of good information are as follows.*

- *Relevance*
- *Clarity*
- *Completeness*
- *Accuracy*
- *Timeliness*
- *Manageable in volume*

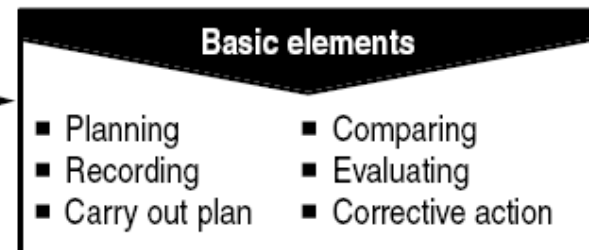
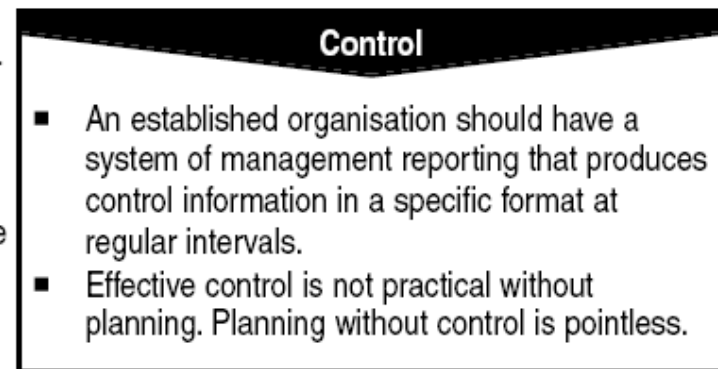
Information is most likely to be used for planning, control or decision making in management accounting



Management is decision taking. Management at all levels within an organisation take decisions. Decision making involves a choice between alternatives.

## Management control system

is a system which measures and corrects the performance of subordinates to ensure organisation's objectives/plans are being met.



The data used to prepare financial accounts and management accounts are the same.  
The differences between these accounts arise because the data is analysed differently.

### Financial accounts

- Prepared for external individuals
- Detail performance of a defined period
- Legal requirements for limited companies to prepare FA
- Format of published FA determined by
  - Law
  - IASs
  - IFRSs
- FA cover business as a whole
- FA information monetary (mostly)
- Historic picture of past operations

### Management accounts

- Prepared for internal managers of an organisation
- Aid management in recording, planning and controlling organisation's activities
- Help decision-making process
- No legal requirements to prepare MA
- Format of MA at discretion of management
- MA can focus on specific areas of an organisation's activities
- MA incorporate non-monetary measures
- Historic record *and* future planning tool

## 2: Cost classification

### Topic List

---

Direct costs and indirect costs

---

Fixed costs and variable costs

---

Other cost classifications

---

Responsibility centres and cost units

---

*The classification of costs is an essential management accounting technique. Its main uses are as follows.*

- *Determination of the cost of a unit of product or service*
- *Cost behaviour*
- *Absorption and marginal costing*
- *Cost-volume-profit (CVP) analysis*



Direct costs and  
indirect costs

Fixed costs and  
variable costs

Other cost  
classifications

Responsibility centres  
and cost units

## Direct cost

is a cost that can be **traced in full** to the product, service or department that is being costed.

### Direct costs include

- Direct materials
- Direct labour
- Direct expenses
- Total direct costs = prime cost



Total product cost

## Indirect cost (overhead)

is a cost that is incurred whilst making a product but which **cannot be traced directly** to the product, service or department.

### Indirect costs include

- Indirect materials
- Indirect labour
- Indirect expenses
- Administration overhead
- Selling and distribution overhead

## Fixed cost

is a cost which is unaffected by changes in the level of activity.



## Variable cost

is a cost which tends to vary with the level of activity.

### Fixed costs include

- Rent of a building
- Business rates
- Salary of a director

Costs may also be semi-fixed or semi-variable or mixed costs. For example, an electricity bill has a fixed standing charge and a variable cost per unit of electricity used.

### Variable costs include

- Direct materials
- Direct labour
- Sales commission (varies with volume of sales)

Direct costs and  
indirect costs

Fixed costs and  
variable costs

Other cost  
classifications

Responsibility centres  
and cost units

### Functional costs

are classified as: **production or manufacturing costs**; administration costs; **marketing or selling** and **distribution costs**.

### Product costs

are costs identified with a finished product and are part of the stock value until they are sold when they become expenses (cost of goods sold).

### Period costs

are costs that are deducted as expenses during a period without ever being part of the stock value.

### Discretionary costs

are costs which are likely to arise from decisions made during the budgeting process.

### Avoidable costs

are costs specific to an activity or business which would be avoided if the activity or business did not exist.

### Unavoidable costs

are costs which would be incurred whether or not the activity or business existed.

### Controllable cost

is a cost which can be influenced by management decisions and actions.

### Uncontrollable cost

is any cost that cannot be affected by management within a given time span.

Direct costs and  
indirect costs

Fixed costs and  
variable costs

Other cost  
classifications

Responsibility  
centres and cost units

A responsibility centre is a department or organisational function whose performance is the direct responsibility of a specific manager.

### Cost centre

is a collecting place for costs before they are analysed further.

COST CENTRE MANAGERS ARE  
RESPONSIBLE FOR COSTS ONLY

### Profit centre

- Similar to a cost centre
- Responsible for costs *and* revenues

### Revenue centre

is a collecting place for revenues before they are analysed further.

REVENUE CENTRE MANAGERS ARE  
RESPONSIBLE FOR REVENUES ONLY

### Investment centre

- Profit centre with additional responsibilities
- Responsible for costs *and* revenues
- Responsible for capital investment and financing

Direct costs and  
indirect costs

Fixed costs and  
variable costs

Other cost  
classifications

Responsibility  
centres and cost units

## Cost unit

is a unit of product or service to which costs can be related.



### Example

- Patient episode (in a hospital)
- Barrel (in the brewing industry)
- Room (in a hotel)

## Cost object

is any activity for which a separate measurement of cost is desired



### Example

- The cost of a product
- The cost of a service
- The cost of operating a department

## 3: Cost behaviour

### Topic List

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Levels of activity

---

Cost behaviour patterns

---

High-low method

---

*Cost behaviour is the way in which costs are affected by changes in the volume of output. Management decisions are often based on the ways in which costs behave. Knowledge of cost behaviour is essential for*

- *Budgeting*
- *Decision making*
- *Control accounting*

Costs are influenced by many factors. The most important factor is the level of activity or volume of output.

**Level of activity may refer to**

- Value of items sold
- Number of items sold
- Number of invoices issued
- Number of units of electricity consumed

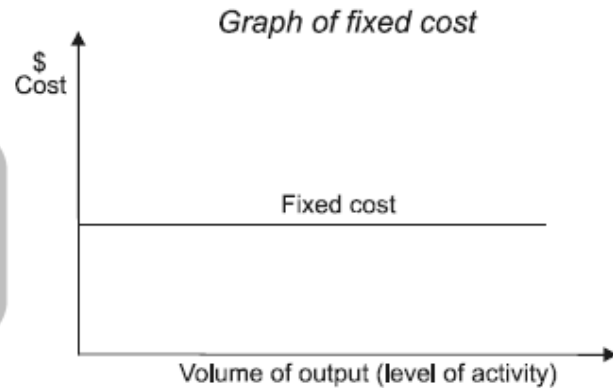
**Basic principles of cost behaviour**

As the level of activity rises, costs will usually rise. It will generally cost more to produce 200 units of output than it will to produce 100 units of output.

In general, level of activity = volume of output

## Fixed cost

is a cost which tends to be unaffected by increases or decreases in the level of activity

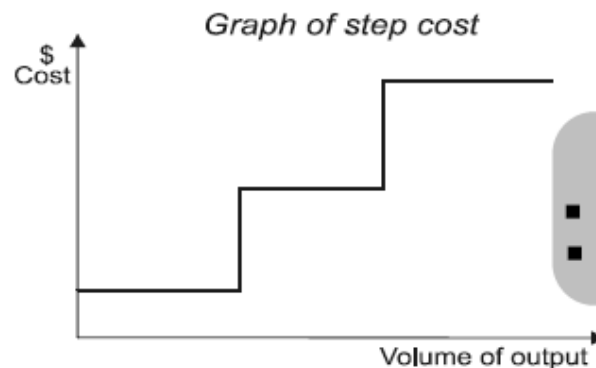


## Examples

- Rent of a single factory building
- Straight line depreciation of a machine

## Step cost

is a cost which is fixed in nature but only within certain levels of activity



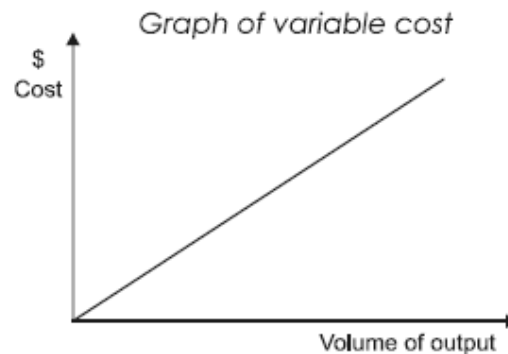
## Examples

- Supervisors' salary costs
- Royalties



## Variable cost

is a cost which varies directly with the level of activity.

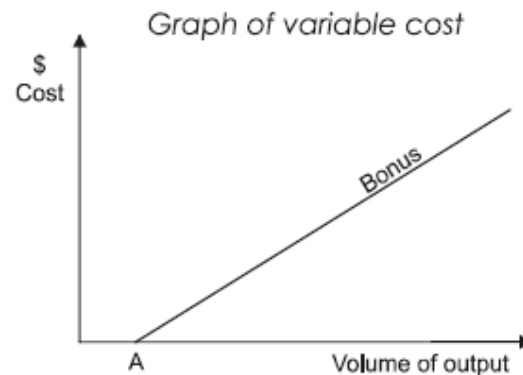


### Examples

- Cost of raw materials
- Direct labour costs
- Sales commission

## Mixed cost

also known as **semi-variable/semi-fixed** cost which contains both fixed and variable elements and is partly affected by changes in the levels of activity.

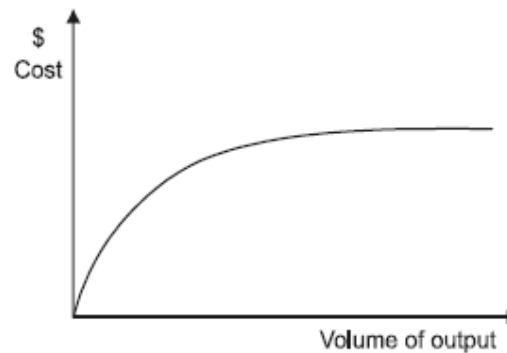


### Examples

- Telephone bills
- Salesman's salary

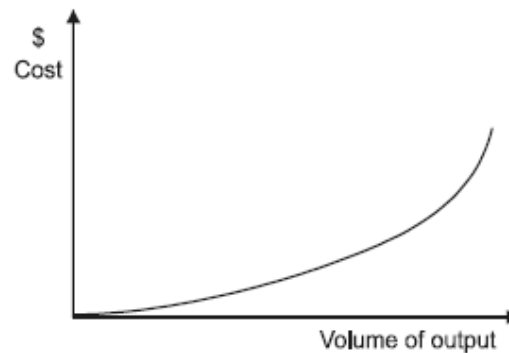
## Non-linear or curvilinear variable cost

is a cost which varies *disproportionately* with increasing output.



### Example

- Savings of scale



### Example

- Piecework

Levels of  
activity

Cost behaviour  
patterns

High-low  
method

It is generally assumed that costs are one of the following

Variable

Fixed

Semi-variable

The fixed and variable elements of semi-variable costs can be determined by the **high-low method**.

**Step 1.** Review past records of costs

Select period with **highest** activity level

Select period with **lowest** activity level

**Step 2.** Adjust for inflation before comparing costs (if needed)

**Step 3.** Determine

Total cost at high activity level (TCH)

Total cost at low activity level (TCL)

Total units at high activity level (TUH)

Total units at low activity level (TUL)

**Step 4.** Calculate variable cost per unit =  $\frac{TCH - TCL}{TUH - TUL}$



**Step 5.** Determine fixed costs by substituting variable cost per unit at high or low activity level



### Example

**Highest activity level** = 10,000 units at a cost of \$4,000

**Lowest activity level** = 2,000 units at a cost of \$1,600

**Variable cost per unit** =  $\frac{\$(4,000 - 1,600)}{10,000 - 2,000} = \frac{\$2,400}{8,000} = \$0.30$

**Fixed cost** =  $\$4,000 - \$(10,000 \times 0.3) = \$1,000$

## 4: Correlation and regression; expected values

### Topic List

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Correlation

---

Coefficient of determination

---

Estimating the line of best fit

---

Expected values

---

*Correlation and regression is a very important topic which forms part of the cost behaviour section of the syllabus. Make sure that you can reproduce the formulae required for linear regression analysis since they are not provided in your exam and it is vital that you are able to establish linear equations using this method.*

## Correlation

is the extent to which the value of a dependent variable is related to the value of the independent variable.



### Degrees of correlation

- Perfectly correlated
- Partly correlated
- Uncorrelated



### Values of r

- $r = +1$  = perfect positive
- $r = -1$  = perfect negative
- $r = 0$  = uncorrelated

### EXAM FORMULA

Correlation  
coefficient,  $r =$

$$\frac{n\sum XY - \sum X \sum Y}{\sqrt{[n\sum X^2 - (\sum X)^2][n\sum Y^2 - (\sum Y)^2]}}$$



THIS FORMULA WILL BE PROVIDED IN YOUR EXAM

## Coefficient of determination, $r^2$

$r^2$  measures the proportion of the total variation in the value of one variable that can be explained by variations in the value of the other variable.

$$\text{If } r = 0.9, r^2 = 0.81$$

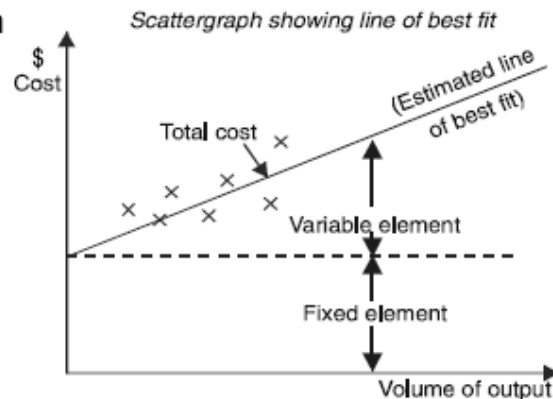
If the correlation coefficient of two variables = 0.9, we know the variables are **positively correlated**. The coefficient of determination,  $r^2 = 0.81$  and this gives a more meaningful analysis. We know that 81% of the variations in the value of  $y$  **could** be explained by variations in the value of  $x$ .

Note: we do not conclude that 81% of variations in  $y$  are caused by variations in  $x$ . We say that 81% of variations in  $y$  can be explained by variations in  $x$ .

## Estimating the line of best fit, $Y = a + bX$ (linear relationship)

### Scattergraph method (draw a graph)

- Plot pairs of data for related variables
- Produce a scattergraph
- Use judgement to draw line of best fit
- Fixed costs = intersection of line on y axis (a)
- Variable cost per unit = gradient of line (b)



### Linear regression analysis (mathematical calculation)

- $$b = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2}$$
- $a = \bar{Y} - b\bar{X}$
- $n$  = number of pairs of data
- $\bar{X}$  = average X value
- $\bar{Y}$  = average Y value



## Expected values

An **expected value** is a **weighted average value** based on probabilities. This can help in decision making.

### Example

A new product is being manufactured. The probabilities of different levels of demand have been estimated as follows:

<i>Probability</i>	<i>Demand (units)</i>	<i>Expected value of demand</i>
0.3	10,000	3,000
0.6	12,000	7,200
0.1	16,000	<u>1,600</u>
		<u>11,800</u>

## 5: Spreadsheets

### Topic List

---

Features and functions

---

Formulae

---

Advantages and disadvantages

---

*Spreadsheets are not a large part of your syllabus but you should understand the basics.*

## Features and functions

A spreadsheet is divided into **rows** and **columns**.

Where they intersect is a **cell**.

Cell contents can be:

- Text
- Values
- Formulae

**Example:**

A	B	C	D	E	F
1					
2		Jan	Feb	Mar	
3	Sales \$	5,000	4,000	6,000	
4	Cost of sales	(3,500)	(2,900)	(4,300)	
5	Gross profit	1,500	1,100	1,700	
6					

### Spreadsheets can be used for:

- Management and financial accounts
- Cash flows
- Reconciliations
- Cost analysis
- Budgets and forecasts
- Financial modelling using 'What if' analysis

## Formulae

Spreadsheets use formulae to perform a variety of calculations.

The simple example would be the formulae in cell C5 on the previous page which would be:  $C3 + C4$ .

If we had shown the values in row 4 as positive amounts, we would have the formulae  $= C3 - C4$  in cell C5.

Formulae can also multiply or divide the contents of one cell by the contents of another as well as dealing with roots, powers and percentages.

An important distinction is between **relative** and **absolute** cell reference.

### Relative cell reference

Cell references are normally relative. This means that a formula can be copied to another cell and the cells it refers to will also change **relative to** the cell which now contains the formula.

### Absolute cell reference

Sometimes we do not want one of the cell references to change. Perhaps that cell contains a tax % which should still apply. So we can make that reference **absolute** by designating it:  $\$C\$5$  instead of C5

### Advantages

- Spreadsheet applications such as Excel are easy to learn and use
- Spreadsheets make the calculation and manipulation of data easier and quicker
- Spreadsheets enable the analysis, reporting and sharing of financial information – they can be sent via email

### Disadvantages

- It is only as good as the data that is input
- Incorrect data may look more plausible when presented in a spreadsheet
- Formulae are hidden from sight so the underlying logic of calculations may not be immediately apparent

## 6: Material costs

### Topic List

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Inventory control

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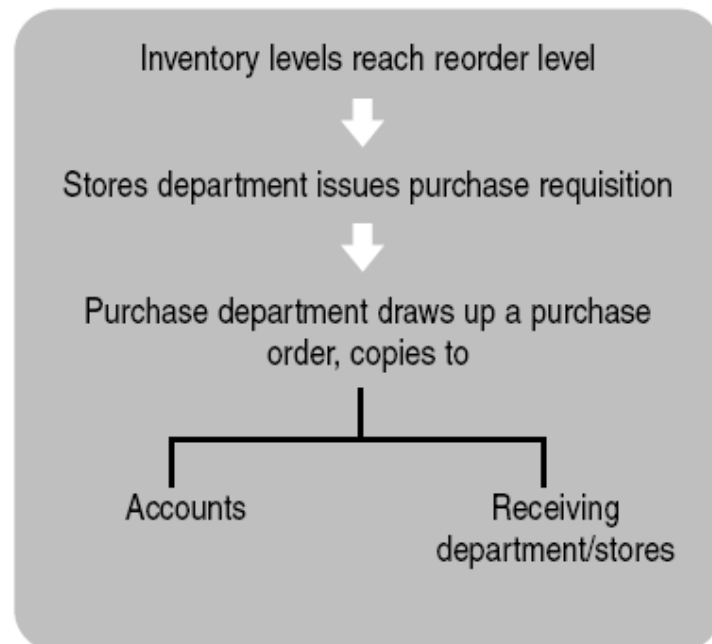
Inventory levels

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*The investment in inventory is a very important one for most businesses. It is therefore vital that management establish and maintain an effective **inventory control system** which covers the following.*

- *The **ordering** of inventory*
- *The purchase of inventory*
- *The **receipt** of goods into store*
- *Storage*
- *The **issue** and maintenance of inventory at the most appropriate level*

## Ordering inventory



## Receiving inventory



## Issuing inventory

Materials requisition received

Inventory transferred

Inventory returned to store



Inventory issued

Materials transfer note

Materials returned note

### Recording inventory levels

- Bin cards
- Stores ledger accounts
- Free inventory available for future use
- Perpetual inventory

### Inventory count

#### Periodic

- Annually
- All items counted on a specific date

#### Continuous

- Each item checked at least once a year
- Specialist team



## Why hold inventory?

- To ensure any unexpected demands can be met
- To meet any future shortages
- Bulk purchasing discounts available
- High inventory levels = increased holding costs
- Low inventory levels = increased ordering costs
- Low inventory levels = increased costs of running out of inventory

## Important formulae

Reorder level = maximum usage  $\times$  maximum lead time

Minimum level = reorder level – (average usage  $\times$  average lead time)

Maximum level = reorder level + reorder quantity – (min. usage  $\times$  min. lead time)

Average inventory = safety inventory +  $1/2$  reorder quantity

## Economic order quantity

is the reorder quantity which minimises the total costs associated with holding and ordering inventory.

$$EOQ = \sqrt{\frac{2C_0D}{C_H}}$$

PROVIDED IN EXAM

## Economic batch quantity

is used instead of the EOQ when re-supply is gradual instead of instantaneous.

$$EBQ = \sqrt{\frac{2C_0D}{C_H(1 - D/R)}}$$

PROVIDED IN EXAM

Where:  $C_0$  = Cost of ordering a consignment from a supplier

$C_H$  = Cost of holding one unit of inventory for one time period

$D$  = Demand during time period

$R$  = Production rate per time period

## 7: Labour costs

### Topic List

---

Measuring labour activity

---

Remuneration methods

---

Labour turnover

---

Labour costs

---

*We have already seen that the investment in inventory is a very important one for most businesses.*

*The other major cost for a business is labour.*

Measuring  
labour activity

Remuneration  
methods

Labour  
turnover

Labour  
costs

## Production

is the volume of output produced.



## Production volume ratio

$$\frac{\text{Expected hours to make output}}{\text{Hours budgeted}}$$

## Standard hour of production

is the number of units produced by one worker working in the standard way at the standard rate for one hour.

## Capacity ratio

$$\frac{\text{Actual hours worked}}{\text{Hours budgeted}}$$

## Productivity

is a measure of efficiency with which output has been produced.



## Efficiency ratio

$$\frac{\text{Expected hours to make output}}{\text{Actual hours taken}}$$

=

×



### Time work

- Wages = hours worked × rate per hour
- Overtime premium = extra rate per hour for hours over and above basic
- Quality more important than quantity
- No incentive for employee performance improvement

### Piecework schemes

- Wages = units produced × rate per unit
- Guaranteed minimum wage
- Differential schemes pay higher rates for increased levels of productivity
- Output inspected carefully

### Bonus/incentive scheme

- Employee paid more for productivity
- Increased profits shared between employer and employee
- High day-rate system
- Bonus schemes (group and individual)
- Profit-sharing schemes
- Incentive schemes involving shares
- Value added incentive schemes

Measuring  
labour activity

Remuneration  
methods

**Labour  
turnover**

Labour  
costs

Labour turnover is measured by the labour turnover rate.

$$\text{Labour turnover rate} = \frac{\text{Replacement}}{\text{Average number employees in period}}$$

### Reasons for labour turnover

- Illness/accident
- Moving
- Marriage/pregnancy
- Better pay elsewhere
- No career enhancement

### Costs

#### Preventative

- Medical services
- Welfare services
- Pension schemes

#### Replacement

- Selection and replacement
- Training
- More wastage due to inexperienced new staff

### Prevention

Labour turnover may be prevented by offering satisfactory wages, hours and conditions and by improving employees' jobs so as to create job satisfaction. In addition, proper planning by management may lead to avoiding redundancies.

**Direct labour costs**

- Basic pay of direct workers
- Overtime worked at specific request of customers
- Overtime worked regularly by production department

**Indirect labour costs**

- Basic pay of indirect workers
- Overtime premium
- Bonuses
- Employer's NIC
- Idle time cost

**WAGES CONTROL A/C**

	DR		CR
	£		£
Net wages paid	X	Direct labour	X
PAYE/NIC deductions	X	Indirect labour	X
		Overtime premium	X
		Shift allowance	X
		Sick pay	X
		Idle time	X
	<u>X</u>		<u>X</u>
	<u>X</u>		<u>X</u>

## 8: Overheads and absorption costing

### Topic List

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Cost allocation

---

Overhead apportionment

---

Overhead absorption

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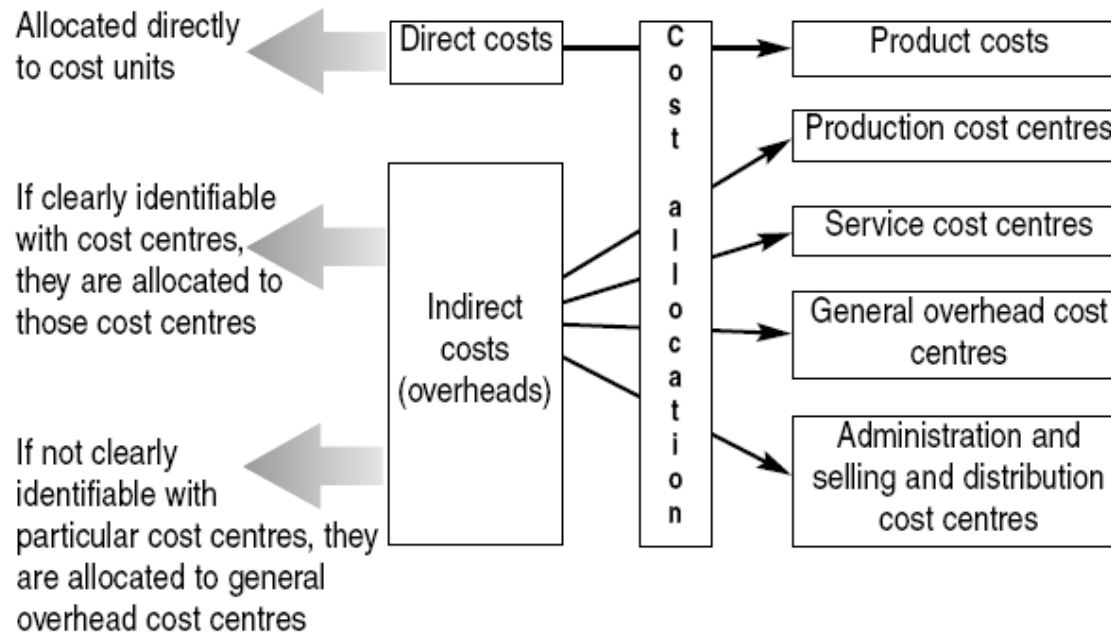
*Absorption costing is a method of accounting for overheads. It is basically a method of sharing out overheads incurred amongst units produced.*

*The three stages of absorption costing are:*

- *Allocation*
- *Apportionment*
- *Absorption*



Allocation is the process by which whole cost items are charged directly to a cost unit or cost centre.



### Example

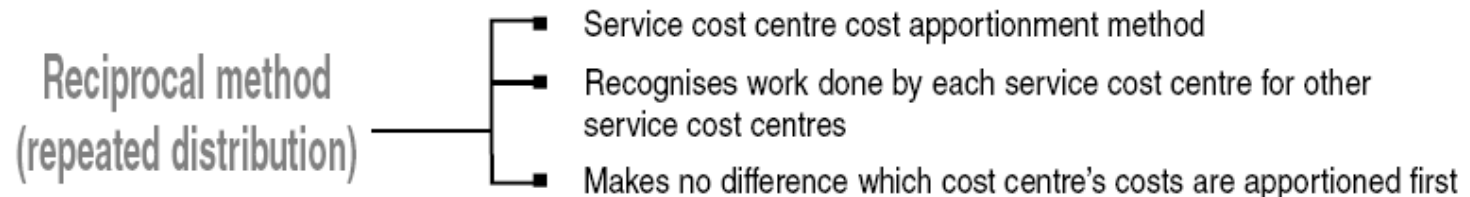
Warehouse security guard

- Cost of security guard charged to warehouse cost centre
- Cost of heat and light to general overhead cost centre

The first stage of overhead apportionment is the identification of all overheads as production, service, administration or selling and distribution.



The second stage of overhead apportionment is to apportion the costs of service cost centres (both directly allocated and apportioned) to production cost centres. This is known as reapportionment.



Cost allocation

Overhead  
apportionment

Overhead  
absorption

The final stage in absorption costing is the absorption of overheads into product costs using overhead absorption rates (OARs).

### Bases of absorption

- Unit (identical units)
- Direct labour hour (labour intensive)
- Machine hour (machine intensive)



### Predetermined OARs

Many overheads are not known until the end of a period. If waited until end of period, would cause delays in invoicing, inventory valuations and so on. Random fluctuations in overheads would create variable OARs from month to month.



Budgeted overheads allocated and  
apportioned to production cost centres  

---

Budgeted activity levels (hours, units etc) on  
which rate to be based



### Departmental OARs

- Used instead of blanket (single factory) OARs
- Reflect different times spent by different products in production cost centres

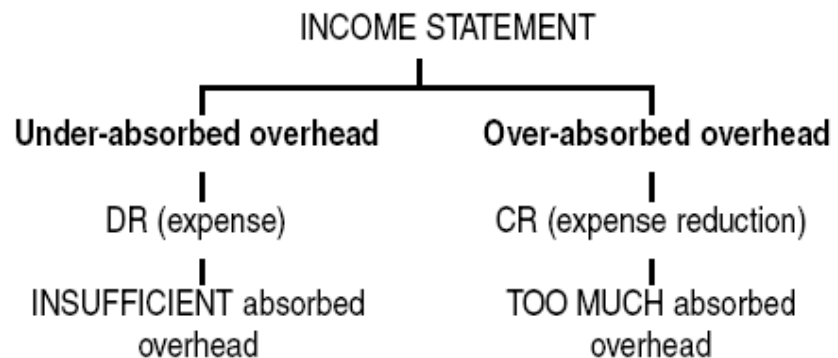
## Over-/under-absorbed overheads

These arise because the OAR is predetermined from budget estimates. When actual overheads incurred and overheads absorbed using predetermined OARs, there will be an over or under absorption of overheads.

### Reasons

- 1 Actual OH  $\neq$  budgeted OH
- 2 Actual activity level  $\neq$  budgeted activity level
- 3 1 and 2 above (together)

## Accounting for over/under absorption of overheads



### Exam focus point

Absorption costing is a key syllabus topic and it is vital that you are able to perform all the relevant techniques and calculations associated with overhead apportionment and absorption.

## 9: Marginal and absorption costing

### Topic List

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Marginal costing principles

---

Profit reconciliation

---

MC versus AC

---

*As you now know, absorption costing recognises fixed costs as part of the cost of a unit of output, ie as product costs. Marginal costing on the other hand treats all fixed costs as period costs. Each costing method therefore gives rise to different profit figures which you must be able to reconcile. Similarly, each costing method has relative advantages and disadvantages.*

## Marginal cost

is the cost of one unit of product/service which would be avoided if that unit were not produced/provided = variable cost

## Contribution

equals (sales revenue – variable (marginal) cost of sales). It is short for contribution towards covering fixed overheads and making a profit.

### Marginal costing

- Only variable costs charged as cost of sales
- Closing inventories are valued at marginal cost
- Fixed costs are treated as period costs
- Period costs are charged in full to P&L a/c
- If sales increase by one item, profit will increase by contribution for one item
- Contribution per unit is constant at all levels of output and sales

The difference in reported profits is calculated as the difference between the fixed production overhead included in the opening and closing inventory valuations using absorption costing.

MARGINAL COSTING → Closing inventories are valued at marginal production cost

ABSORPTION COSTING → Closing inventories are valued at full production cost

RECONCILIATION

	\$
Marginal costing profit	X
Adjust for fixed overheads in inventory:	
+ increase / – decrease	X/(X)
Absorption costing profit	<u>X</u>

Inventory levels

**Increase in a period**

- Absorption costing reports higher profit
- Fixed overheads included in closing inventory
- Cost of sales decreased
- Hence, profit higher

**Decrease in a period**

- Absorption costing reports lower profit
- Fixed overheads included in opening inventory
- Cost of sales increased
- Hence, profit lower

### **Arguments in favour of absorption costing**

- Fixed production costs are incurred in order to make output and so it is only 'fair' to charge all output with a share of these costs
- Closing inventory will be valued in accordance with IAS 2
- Appraising products in terms of contribution gives no indication of whether fixed costs are being covered



### Arguments in favour of marginal costing

- Absorption costing information is irrelevant when making short-run decisions
- It is simple to operate
- There are no arbitrary fixed cost apportionments
- Fixed costs in a period will be the same regardless of the level of output and so it makes sense to charge them in full as a cost of the period
- It is realistic to value closing inventory items at the (directly attributable) cost to produce an extra unit
- Under/over absorption is avoided
- Absorption costing gives managers the wrong signals. Goods are produced, not to meet demand, but to absorb allocated overheads. Absorption costing profit may therefore be increased merely by producing in excess of sales. Production in excess of demand in fact increases the overheads (for example warehousing) the organisation must bear

## 10: Process costing

### Topic List

Process costing framework

Losses and gains

Scrap

Closing WIP

Opening WIP

*Process costing is a costing method used where it is not possible to identify separate units of production, or jobs, usually because of the continuous nature of the production processes involved. Features of process costing include the following.*

- *The output of one process becomes the input of the next*
- *Closing WIP must be valued at the end of the process*
- *There is often a loss in process*
- *There may be by-products and/or joint products*

**Process costing  
framework**

Losses and  
gains

Scrap

Closing WIP

Opening WIP

Process costing is centred around four key steps. The exact work done at each step will depend on whether there are normal losses, scrap, opening and closing inventory.

**Step 1.** Determine output and losses



**Step 2.** Calculate cost per unit of output, losses and WIP



**Step 3.** Calculate total cost of output, losses and WIP

Determine expected output

Calculate losses and gains

Calculate equivalent units if there is WIP

Calculate cost per unit or cost per equivalent unit

If there is opening and/or closing WIP, a statement of evaluation will have to be prepared



**Step 4.** Complete accounts



Complete the process account

Process costing  
framework

Losses and  
gains

Scrap

Closing WIP

Opening WIP

## Normal loss

is the loss expected during a process. It is not given a cost.



Costs of normal loss are spread across expected units of output.



Cost per unit (normal loss) = \$NIL

## Abnormal loss

arises when actual loss is greater than expected loss. It is given a cost.



Abnormal losses/gains are taken to the profit and loss account for the period. They are valued at the same cost per unit as good units.



Cost per unit = 
$$\frac{\text{\$INPUT COSTS}}{\text{EXPECTED OUTPUT}}$$

## Abnormal gain

arises when actual loss is less than expected loss. It is given a 'negative cost'.



## Example

PROCESS ACCOUNT					
	Units	\$		Units	\$
Costs incurred	1,000	4,500	Normal loss	100	—
			Abnormal loss	50	*250
			Output to finished goods	850	*4,250
	<u>1,000</u>	<u>4,500</u>		<u>1,000</u>	<u>4,500</u>

\*Cost per unit =  $\$4,500 / (1,000 - 100) = \$5$

ABNORMAL LOSS ACCOUNT					
	Units	\$		Units	\$
Process account	<u>50</u>	<u>250</u>	Income statement	<u>50</u>	<u>250</u>

An abnormal gain would be a debit to the process account.

Revenue from scrap is treated as a reduction in costs.

REMEMBER! Only the scrap value of normal loss affects the process account.

#### Normal loss scrap value

- Material costs of process reduced by scrap value of normal loss
- DR Scrap account
- CR Process account

#### Abnormal loss scrap value

- Cost of abnormal loss is reduced by the scrap value of abnormal loss
- DR Scrap account
- CR Abnormal loss account

#### Abnormal gain scrap value

- Scrap value is less than expected because there is no normal loss
- DR Abnormal gain account
- CR Scrap account

#### Cash received from sale of scrap

- Cash received from sale of scrap completes the scrap account
- DR Cash
- CR Scrap account

Equivalent units of production provide a basis for apportioning costs between closing WIP and finished goods.

**Step 1.** Prepare a statement of equivalent units

<i>Input</i> Units	<i>Output</i>	<i>Total</i> Units	%	<i>Material</i> Units	%	<i>Labour and overhead</i> Units	%
4,000	Completed production	3,200	100	3,200	100	3,200	100
	Closing inventory	800	100	800	100	480*	60
<u>4,000</u>		<u>4,000</u>		<u>4,000</u>		<u>3,680</u>	

$$*800 \times 60\% = 480$$

**Step 2.** Prepare a statement of cost (per equivalent unit)

<i>Input</i>	<i>Cost</i> \$	<i>Equivalent units</i>	<i>Cost per unit</i> \$
Material	6,000	4,000	1.50
Labour and o/head	4,416	3,680	1.20
	<u>10,416</u>		<u>2.70</u>



Process costing  
framework

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Scrap

Closing WIP

Opening WIP

**Step 3.** Prepare a statement of evaluation

	<i>Equiv. units</i>	<i>Cost per equiv. unit</i>	<i>Total value</i>	
			\$	\$
Completed production	3,200	2.70		8,640
Closing inventory: material	800	1.50	1,200	
labour and o/head	480	1.20	<u>576</u>	
				<u>1,776</u>
				<u><u>10,416</u></u>

**Step 4.** Prepare the process account

#### PROCESS ACCOUNT

	Units	\$		Units	\$
Material	4,000	6,000	Finished goods	3,200	8,640
Labour and o/head		<u>4,416</u>	Closing inventory c/f 800		<u>1,776</u>
	<u>4,000</u>	<u>10,416</u>		<u>4,000</u>	<u>10,416</u>

## Closing work in progress and losses

- Prepare a statement of equivalent units
- Deduct the scrap value of normal loss from material costs when calculating the cost per equivalent unit
- Prepare a statement of evaluation (for completely worked units, closing inventory and abnormal loss/gain)
- The process account will include normal loss valued at scrap value and values for completely worked units, closing inventory and abnormal loss/gain from the statement of evaluation



	<i>Equivalent units</i>					
	<i>Total</i>		<i>Material</i>		<i>Labour</i>	
	<i>Units</i>		<i>% Units</i>		<i>% Units</i>	
Completed production	X	100	X	100	X	
Closing inventory	X	80	X	50	X	
Normal loss	X	—	—	—	—	
Abnormal loss/gain	X/(X)	100	X	100	X	
	<u>X</u>		<u>X</u>		<u>X</u>	
	<u><u>X</u></u>		<u><u>X</u></u>		<u><u>X</u></u>	

Process costing  
framework

Losses and  
gains

Scrap

Closing WIP

Opening WIP

## FIFO method

Assumption: first units completed in any period are the units of opening inventory

■ Statement of equivalent units

■ Statement of cost per equivalent unit

Costs incurred in period  
Equivalent units

=  $\frac{\$26,400 \text{ (say)}}{2,640}$

= \$10 per equivalent unit

■ Statement of evaluation

	Units		Equivalent units
Opening inventory units completed	500	*(40%)	200
Fully worked units	<u>2,200</u>	(100%)	<u>2,200</u>
Finished output	2,700		2,400
Closing inventory	<u>300</u>	(80%)	<u>240</u>
	<u>3,000</u>		<u>2,640</u>

\*Percentage of work to complete opening inventory

	Equivalent units	Valuation \$
Opening inventory units completed	200	2,000
Fully worked units	2,200	22,000
Closing inventory	240	<u>2,400</u>
		<u>26,400</u>

PROCESS ACCOUNT					
	Units	\$		Units	\$
Opening inventory	500	*2,800	Finished goods:		
Materials	2,500		Opening inventory		
Conversion cost		26,400	completed	500	**4,800
			Fully worked units	2,200	22,000
				<u>2,700</u>	<u>26,800</u>
			Closing inventory	300	2,400
	<u>3,000</u>	<u>29,200</u>		<u>3,000</u>	<u>29,200</u>

\*Brought forward value of opening inventory from previous period (say)  
 \*\*2,800 (b/f) + \$2,000 (current period)

## Weighted average method

By this method no distinction is made between units of opening inventory and new units introduced to the process during the accounting period. The cost of opening inventory is added to costs incurred during the period and completed units of opening inventory are each given a value of one full equivalent unit of production.

## Identification of losses/gains at different stages of the process

- If units are rejected as scrap or 'loss' at an inspection stage before the completion of processing, units of abnormal loss should count as a proportion of an equivalent unit, according to the volume of work done and materials added up to the point of inspection.
- Units of abnormal gain are *always* 100% complete.

Process costing  
framework

Losses and  
gains

Scrap

Closing WIP

Opening WIP

## Weighted average method

Statement of equivalent units

Statement of cost per equivalent unit

$$\frac{\text{Costs b/f in opening inventory} + \text{costs incurred in period}}{\text{Equivalent units}}$$

$$= \frac{\$(2,800 + 26,400)}{2,940} = \$9.932$$

### PROCESS ACCOUNT

	Units	\$		Units	\$
Opening inventory	500	2,800	Finished goods	2,700	26,816
Materials	2,500		Closing inventory	300	2,384
Conversion cost		26,400			
	<u>3,000</u>	<u>29,200</u>		<u>3,000</u>	<u>29,200</u>

	Units		Equivalent units
Opening inventory	500	(100%)	500
Fully worked units	<u>2,200</u>	(100%)	<u>2,200</u>
Finished output	2,700		2,700
Closing inventory	<u>300</u>	(80%)	<u>240</u>
	<u>3,000</u>		<u>2,940</u>

	Equivalent units	Valuation \$
Output to finished goods	2,700 × \$9.932	26,816
Closing inventory	240 × \$9.932	<u>2,384</u>
		<u>29,200</u>

## 11: Process costing, joint products and by-products

### Topic List

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Joint products

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By-products

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*The Study Guide for F2 requires you to be able to:*

- *Distinguish between joint products and by-products*
- *Value joint products and by-products at the point of separation*
- *Prepare process accounts in situations where joint products and/or by-products occur*

## Joint products

are two or more products which are output from the same processing operation, but which are indistinguishable from each other up to their point of separation (split-off point).

### Features

- Possess substantial sales value before or after further processing
- Important saleable items – should be separately costed

- Costs incurred up to the point of separation need to be apportioned between all joint products
- Apportioning costs assists
  - Inventory valuation
  - Profitability analysis
  - Pricing

### Two main methods

**1**

Physical measurement

**2**

Sales value at split-off point

## Physical measurement method

Cost apportioned on basis of proportion that output of each product bears by weight or volume to the total output.

This method is unsuitable where products separate into different states during processing.

						Apportioned costs
						\$
PROCESS Common costs \$3,000	→	Joint product 1	500 tonnes	JP1	$500/1,500 \times \$3,000$	1,000
	→	Joint product 2	<u>1,000 tonnes</u>	JP2	$1,000/1,500 \times \$3,000$	<u>2,000</u>
			<u>1,500 tonnes</u>			<u>3,000</u>

## Sales values at split-off point

Costs apportioned according to the product's ability to produce income, ie in the following proportion: sales value of joint product ÷ total sales value of process's output.

						Apportioned costs
						\$
PROCESS Common costs \$3,000	→	Joint product 1	Sales value \$ 5,000	JP1	$5,000/15,000 \times \$3,000$	1,000
	→	Joint product 2	Sales value <u>10,000</u>	JP2	$10,000/15,000 \times \$3,000$	<u>2,000</u>
			<u>15,000</u>			<u>3,000</u>



## By-product

is supplementary or secondary product which arises as the result of a process.  
The value of a by-product is small relative to that of the principal product.

### By-product is usual occurrence

Calculate the **net proceeds** of the by-product and reduce process costs by this amount (CR Process account).

### By-product is a one-off

Calculate the **net proceeds** of the by-product and treat as miscellaneous income in the income statement.

Joint costs are never allocated to a by-product

**Net proceeds** = final saleable value *minus* post-separation costs

## 12: Job, batch and service costing

### Topic List

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Job and batch costing

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Features of service costing

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Service cost analysis

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*Job, batch and service costing are types of costing system. Job costing and batch costing are very similar systems.*

*You need to be able to describe the characteristics of the different costing systems in your exam.*

## A job

is a cost unit which consists of a single order or contract.



## Profit on jobs

Profit may be expressed either as a percentage of job cost (such as 25%) (25/100) mark up or as a percentage of price, such as 20% (25/125) margin.

## Batch costing

is very similar to job costing.

$$\text{Cost per unit} = \frac{\text{Total batch cost}}{\text{No. units in batch}}$$

### Features of job costing

- Work is undertaken to customers' special requirements
- Each order is of short duration
- Jobs move through operations as a continuously identifiable unit
- Jobs are usually individual and separate records should be maintained

Job costs are collected on a job cost sheet/card

## Service costing

is a costing method concerned with establishing the costs of services rendered.

### Two main types of service

- Services provided by a company operating in a service industry
- Services provided by a company's service departments

### Characteristics of services

- Intangibility
- Simultaneity
- Perishability
- Heterogeneity

## Purpose of service costing

Many services are revenue earning but others are not. Hence the purpose of service costing might be to provide management information on costs and efficiency rather than to establish profit or loss.

Job and batch  
costing

Features of  
service costing

Service cost  
analysis

## Unit cost measures

Composite cost unit frequently appropriate

### Examples

- Canteen – meal served
- Hospital – patient
- Hotel – occupied bed-night

## Cost per service cost unit

$$\frac{\text{Total costs for period}}{\text{Number of service units provided in period}}$$

Organisations need to ascertain the **cost unit** most appropriate to its activities. Organisations within the same industry can make valuable comparisons if they use a common cost unit.

### Objectives of service cost analysis

- Compare planned cost with actual cost
- Calculate a cost per unit of service
- Use cost per service unit as part of control function
- Calculate prices for services being sold to third parties
- Analyse costs to assist planning, control and decision making

### Internal service situations

- Aim to control costs in service department
- Aim to control costs in the user department

### Service industry situations

- Need to calculate a cost per unit as for same reasons as job costs or contract costs are calculated

## 13: Budgeting

### Topic List

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A framework for budgeting

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Budget preparation

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Functional budgets

---

Flexible budgets

---

*You must understand the budgeting process.*

### Uses of budgets

- Planning
- Communication
- Coordination
- Responsibility accounting
- Control
- Motivation

The responsibility for preparing budgets should lie with the managers who are responsible for implementing them.

- Sales manager → sales budget
- Purchasing manager → material purchases budget
- Production manager → direct production cost budgets

Reward for managers can be built into the budget process and their achievement of budget targets.

### Budget committee functions


- Coordinating and allocating responsibility
- Issuing the budget manual
- Timetabling
- Providing information
- Comparing actual and budgeted results

### Budget manual contents

- Explanation of budgetary process objectives
- Organisational structures
- Outline of principal budgets
- Administrative details of budget preparation
- Procedural matters



## The order of budget preparation

- 1 Identify the principal budget factor 
- 2 Prepare a sales budget (units of product **and** sales value) and then a finished goods inventory budget (to determine the planned change in finished goods inventory levels)
- 3 Prepare a production budget (sales  $\pm$  budgeted change in finished goods inventory levels, in units)
- 4 Prepare production resources budgets (materials usage, machine usage, labour)
- 5 Prepare a materials inventory budget (to determine the planned change in materials inventory levels)
- 6 Prepare a raw materials purchases budget in units and value (usage  $\pm$  budgeted change in materials inventory)
- 7 Prepare overhead budgets
- 8 Prepare the master budget (budgeted income statement, budgeted balance sheet, cash budget)

The factor which limits the activities of an organisation

A framework  
for budgeting

Budget  
preparation

**Functional  
budgets**

Flexible  
budgets

Functional (departmental) budgets include the sales budget, production budgets, materials and labour budgets.

## Example

XYZ Company produces three products X, Y and Z. For the coming accounting period budgets are to be prepared based on the following information.

### *Budgeted sales*

Product X	2,000 at \$100 each
Product Y	4,000 at \$130 each
Product Z	3,000 at \$150 each

### *Budgeted usage of raw material*

	RM11	RM22	RM33
Product X	5	2	—
Product Y	3	2	2
Product Z	2	1	3
Cost per unit	\$5	\$3	\$4

### *Finished inventory budget*

	X	Y	Z
Beginning	500	800	700
End	600	1,000	800

### *Raw materials inventory*

	RM11	RM22	RM33
Beginning	21,000	10,000	16,000
End	18,000	9,000	12,000
	X	Y	Z
Expected hours per unit	4	6	8
Expected hourly rate (labour)	\$3	\$3	\$3

(a) **Sales budget**

	X	Y	Z	Total
Sales quantity	2,000	4,000	3,000	
Sales price	\$100	\$130	\$150	
Sales value	<u>\$200,000</u>	<u>\$520,000</u>	<u>\$450,000</u>	<u>\$1,170,000</u>

(b) **Production budget**

	X	Y	Z
	Units	Units	Units
Sales quantity	2,000	4,000	3,000
Closing inventory	<u>600</u>	<u>1,000</u>	<u>800</u>
	2,600	5,000	3,800
Less opening inventory	<u>(500)</u>	<u>(800)</u>	<u>(700)</u>
Budgeted production	<u>2,100</u>	<u>4,200</u>	<u>3,100</u>

A framework  
for budgeting

Budget  
preparation

**Functional  
budgets**

Flexible  
budgets

### Example (continued)

(c) **Material usage budget**

	Production Units	RM11 Units	RM22 Units	RM33 Units
Product X	2,100	10,500	4,200	–
Product Y	4,200	12,600	8,400	8,400
Product Z	3,100	6,200	3,100	9,300
Budgeted material usage		<u>29,300</u>	<u>15,700</u>	<u>17,700</u>

(d) **Material purchases budget**

	RM11 Units	RM22 Units	RM33 Units
Budgeted material usage	29,300	15,700	17,700
Closing inventory	18,000	9,000	12,000
	<u>47,300</u>	<u>24,700</u>	<u>29,700</u>
Less opening inventory	(21,000)	(10,000)	(16,000)
Budgeted material purchases	<u>26,300</u>	<u>14,700</u>	<u>13,700</u>
Standard cost per unit	\$5	\$3	\$4
Budgeted material purchases	<u>\$131,500</u>	<u>\$44,100</u>	<u>\$54,800</u>

## Fixed budgets

These are budgets which are set for a single activity level. Master budgets are fixed budgets.

versus

## Flexible budgets

These are budgets which, by recognising different cost behaviours patterns, change as activity levels change.

### To prepare a flexible budget:

- 1 Decide whether costs are fixed, variable or semi-variable, and split semi-variable costs using the high/low or scattergraph methods
- 2 Calculate the budget cost allowance for each item = budgeted fixed cost\* + (number of units × variable cost per unit)\*\*

\* nil for variable cost

\*\* nil for fixed cost

## Using flexible budgets for control

- 1 Produce a flexible budget based on the **actual** activity level.
- 2 Compare the flexible budget with the fixed budget, and with actual results.
- 3 Identify variances.  
Volume variance = difference between fixed budget and flexible budget  
Expenditure variance = difference between flexible budget and actual results

A framework  
for budgeting

Budget  
preparation

Functional  
budgets

Flexible  
budgets

## Example

MK Company has prepared budgeted profit forecasts based on 90%, 100% (50,000 units) and 105% activity. Actual results and budgets are as follows.

	90%	<i>Budgets</i>		Actual (37,500 units sold)
	\$	100%	105%	\$
<i>Revenue</i>	1,350,000	1,500,000	1,575,000	1,075,000
<i>Costs</i>				
Material cost	337,500	375,000	393,750	311,750
Labour cost	405,000	450,000	472,500	351,500
Prod overhead cost	120,000	130,000	135,000	117,500
Administration cost	70,000	70,000	70,000	66,500
	<u>932,500</u>	<u>1,025,000</u>	<u>1,071,250</u>	<u>847,250</u>
Profit	<u><u>417,500</u></u>	<u><u>475,000</u></u>	<u><u>503,750</u></u>	<u><u>227,750</u></u>

The flexed budget showing the revenue and costs associated with 37,500 units sold is as follows.

### Example (continued)

	<i>Flexed budget</i>
	\$
<i>Revenue</i>	1,125,000 (W1)
<i>Costs</i>	
Material cost	281,250 (W2)
Labour cost	337,500 (W3)
Production overhead cost	105,000 (W4)
Administration cost	70,000 (W5)
	<u>793,750</u>
Profit	<u>331,250</u>

### Workings

- $37,500 \times (1,500,000/50,000)$
- Material costs are variable, cost per unit =  $\$375,000/50,000$   
=  $\$7.50$ , budget cost allowance =  $\$7.50 \times 37,500$
- Labour costs are variable, cost per unit =  $\$450,000/50,000 = \$9$ ,  
budget cost allowance =  $\$9 \times 37,500$
- Production overhead is a semi-variable cost.  
At 90%, activity level =  $50,000 \times 0.9 = 45,000$  units  
Variable cost of  $(50,000 - 45,000)$  units =  $\$(130,000 - 120,000)$   
 $\therefore$  Variable cost per unit =  $\$10,000/5,000 = \$2$  per unit  
 $\therefore$  Fixed cost =  $\$130,000 - (50,000 \times \$2) = \$30,000$   
Budget cost allowance =  $\$(30,000 + (37,500 \times 2))$
- Administration costs are a fixed cost

A framework  
for budgeting

Budget  
preparation

Functional  
budgets

Flexible  
budgets

Suppose the fixed budget in the previous example was 100% activity, the budgetary control report would be prepared as follows. The budget variance are calculated by comparing the flexible budget and the actual results.

	<i>Fixed budget</i>	<i>Flexible budget</i>	<i>Actual results</i>	<i>Budget variance</i>
	\$	\$	\$	\$
<i>Revenue</i>	1,500,000	1,125,000	1,075,000	50,000 (A)
<i>Costs</i>				
Material cost	375,000	281,250	311,750	30,500 (A)
Labour cost	450,000	337,500	351,500	14,000 (A)
Production overhead cost	130,000	105,000	117,500	12,500 (A)
Administration cost	70,000	70,000	66,500	3,500 (F)
	<u>1,025,000</u>	<u>793,750</u>	<u>842,250</u>	<u>53,500 (A)</u>
Profit	<u>475,000</u>	<u>331,250</u>	<u>227,750</u>	<u>103,500</u>
	<div>Volume variance \$143,750 (A)</div>		<div>Expenditure variance \$103,500 (A)</div>	
	<div>Total variance \$247,250 (A)</div>			



## 14: Standard costing

### Topic List

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Standard costing

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Setting standards

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*A standard cost is an estimated unit cost built up from standards for each cost element. It is based on expected prices of the following.*

- *Materials, labour and expenses*
- *Efficiency levels in the use of materials and labour*
- *Budgeted overhead costs and budgeted levels of activity*

## Standard costing

is a control technique which compares standard costs and revenues with actual results to obtain variances which are used to stimulate improved performance.



### Uses

- To value stocks and cost production
- To act as a control device via variance analysis

The total standard cost of a product is built up from standards for each cost element



### Examples

- Standard quantities of materials at standard prices
- Standard quantities of labour time at standard rates

## STANDARD COST CARD

### PRODUCT LW

	\$
Direct material (standard quantity × standard price)	X
Direct labour (standard time × standard rate)	<u>X</u>
Standard direct cost	X
Variable production overhead (standard time × standard rate)	<u>X</u>
Standard variable cost of production	X
Fixed production overhead (standard time × standard rate)	<u>X</u>
Standard full production cost	X
Administration and marketing overhead	<u>X</u>
Standard cost of sale	X
Standard profit	<u>X</u>
Standard selling price	<u><u>X</u></u>

**Material price standards**

- Estimated by purchasing department
- Problems of allowing for inflation

**Labour rate standards**

- Set by reference to payroll records
- Average rate for each grade of employee
- Problem of wage rate inflation

**Material price standards**

- Standard absorption rate = predetermined rate OAR

$$\text{OAR} = \frac{\text{Budgeted overheads}}{\text{Budgeted activity level}}$$

■ **Material usage and labour efficiency**■ **Technical specifications**

- Standard product specification
- Standard operation sheet

■ **Types of standard**

- Ideal
- Attainable

**Problems**

- Inflation
- Choice of an efficiency standard
- Materials quality versus wastage
- Accounting for price variations/discounts
- Behavioural problems
- Cost of setting up
- Time to set up

## 15: Basic variance analysis

### Topic List

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Direct material cost variances

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Direct labour cost variances

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Variable production overhead variances

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Fixed production overhead variances

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Reasons and significance

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*A variance is the difference between an actual result and an expected result.*

*Variance analysis is the process by which the total difference between standards and actual results is analysed. When actual results are better than expected results, we have a favourable variance (F). When actual results are worse than expected results we have an adverse (A) variance.*

Direct material  
cost variances

Direct labour  
cost variances

Variable production  
overhead variances

Fixed production  
overhead variances

Reasons and  
significance

### Direct material total variance

	\$
1,000 units should have cost	100,000
but did cost	<u>98,600</u>
Direct material total variance	<u><u>1,400 (F)</u></u>

### Example

Product LW has a standard direct material cost as follows.

10 kg of material M at \$10 per kg = \$100 per unit of M.

During a period, 1,000 units of LW were manufactured, using 11,700 kg of material M, which cost \$98,600.

### Direct material price

	\$
11,700 kg of M should have cost	117,000
but did cost	<u>98,600</u>
<b>Material M price variance</b>	<u><u>18,400 (F)</u></u>

### Direct material usage

1,000 units should have used (× 10 kg)	10,000 kg
but did use	<u>11,700 kg</u>
Usage variance in kgs	1,700 kg (A)
× standard cost per kilogram	<u>× \$10</u>
<b>Material M usage variance</b>	<u><u>\$17,000 (A)</u></u>

Direct material cost variance = material price variance + material usage variance

<b>Direct labour total variance</b>	\$
1,500 units of product LW should have cost (× \$10)	15,000
but did cost	<u>17,500</u>
<b>Direct labour total variance</b>	<u><u>2,500 (A)</u></u>

<b>Direct labour rate variance</b>	\$
3,080 hours of grade A labour should have cost (× \$5)	15,400
but did cost	<u>17,500</u>
<b>Direct labour rate variance</b>	<u><u>2,100 (A)</u></u>

**Idle time variance = idle hours × standard rate per hour = 100 × \$5 = \$500 (A)**

## Example

The standard direct labour cost of product LW is as follows.

2 hours of grade A labour at \$5 per hour = \$10 per unit of product LW

During a period, 1,500 units of product LW were made, and the direct labour cost of grade A labour was \$17,500 for 3,080 hours of work. 100 hours were recorded as idle time.

## Direct labour efficiency variance

1,500 units of product LW should take (× 2 hours)	3,000 hrs
but did take (3,080 – 100)	<u>2,980 hrs</u>
Direct labour efficiency variance in hrs	20 hrs (F)
× standard rate per hour	<u>× \$5</u>
<b>Direct labour efficiency variance in \$</b>	<u><u>100 (F)</u></u>

Direct labour total variance = labour rate variance + labour efficiency variance

Direct material  
cost variances

Direct labour  
cost variances

Variable production  
overhead variances

Fixed production  
overhead variances

Reasons and  
significance

## Example

The variable production overhead cost of product LW is as follows.

2 hours @ \$1.50 = \$3 per unit

During a period, 6,400 units of product LW were made. The labour force worked 820 hours, of which 60 were recorded as idle time. The variable overhead cost was \$1,230.

### Expenditure variance

	\$
760 hours of var. prod. o'head should cost (× \$1.50)	1,140
but did cost	<u>1,230</u>
Variable production overhead expenditure variance	<u>90 (A)</u>

### Efficiency variance

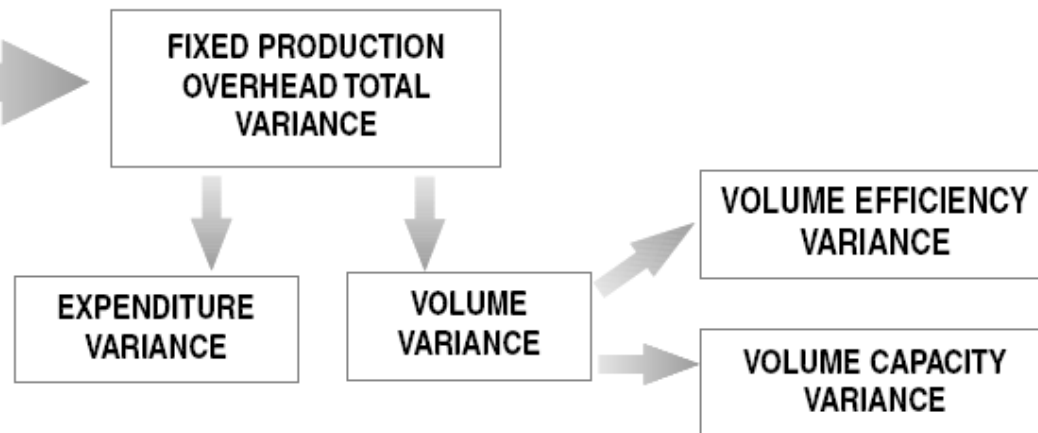
400 units of product LW should take (× 2 hrs)	800 hrs
but did take (active)	<u>760 hrs</u>
Variable prod. o'head efficiency variance in hours	40 hrs (F)
× standard rate per hour	<u>× \$1.50</u>
Variable production overhead efficiency variance in \$	<u>\$60 (F)</u>



In an absorption costing system, fixed production overhead variances are an attempt to explain the under or over absorption of fixed production overheads.

Method of calculating cost variances for variable cost items is essentially same for materials, labour and overheads.

Calculation of fixed  
production overheads  
is very different



Direct material  
cost variances

Direct labour  
cost variances

Variable production  
overhead variances

**Fixed production  
overhead variances**

Reasons and  
significance

## Example

Budgeted production 1,000 units of product A

Actual fixed overhead expenditure = \$20,450

Time required to produce one unit of product A = 5 hours

Actual production = 1,100 units of A

Budgeted fixed overhead = \$20,000

Actual hours worked = 5,400

Standard fixed overhead cost per unit of product A = \$20 per unit



Fixed overhead incurred	\$ 20,450
Fixed overhead absorbed (1,100 × \$20)	<u>22,000</u>
<b>Fixed overhead total variance</b>	<u><u>1,550 (F)</u></u>

over-absorbed overhead

Adverse variance because actual expenditure was greater than budgeted expenditure

Budgeted fixed overhead expenditure	\$ 20,000
Actual fixed overhead expenditure	<u>20,450</u>
<b>Fixed overhead expenditure variance</b>	<u><u>450 (A)</u></u>

Actual production at std rate (1,100 × \$20)	\$ 22,000
Budgeted production at std rate (1,000 × \$20)	<u>20,000</u>
<b>Fixed overhead volume variance</b>	<u><u>2,000 (F)</u></u>

Favourable variance because output was greater than expected

The fixed overhead volume variance can be further subdivided into a fixed overhead volume efficiency variance and a fixed overhead volume capacity variance

### FIXED OVERHEAD VOLUME VARIANCE

1,100 units should take (× 5 hrs)	5,500 hrs
but did take	<u>5,400 hrs</u>
Fixed overhead volume efficiency variance in hours	100 hrs (F)
× standard fixed overhead absorption rate per hour	<u>× \$4</u>
<b>Fixed overhead volume efficiency variance in \$</b>	<u><b>\$400 (F)</b></u>

The volume efficiency variance is calculated the same way as the labour efficiency variance

Budgeted hours of work	5,000 hrs
Actual hours worked	<u>5,400 hrs</u>
Fixed overhead volume capacity variance in hours	400 hrs (F)
× standard fixed overhead absorption rate per hour	<u>\$4</u>
<b>Fixed overhead volume capacity variance in \$</b>	<b>\$1,600 (F) ↑</b>

The volume capacity variance is favourable because actual hours worked are greater than budgeted hours of work

Direct material  
cost variances

Direct labour  
cost variances

Variable production  
overhead variances

Fixed production  
overhead variances

Reasons and  
significance

### Material price

#### Favourable

- Unforeseen discounts
- Material std changed

#### Adverse

- Price increase
- Careless purchasing

### Material usage

#### Favourable

- Higher quality material
- Effective use of material

#### Adverse

- Defective material
- Excessive waste

### Variable and fixed overhead

#### Favourable

- Cost savings

#### Adverse

- Excessive use

### Labour rate

#### Favourable

- Lower rate paid

#### Adverse

- Wage rate increase

### Idle time

- Machine breakdown
- Illness/injury

### Labour efficiency

#### Favourable

- Motivated staff
- Quality materials

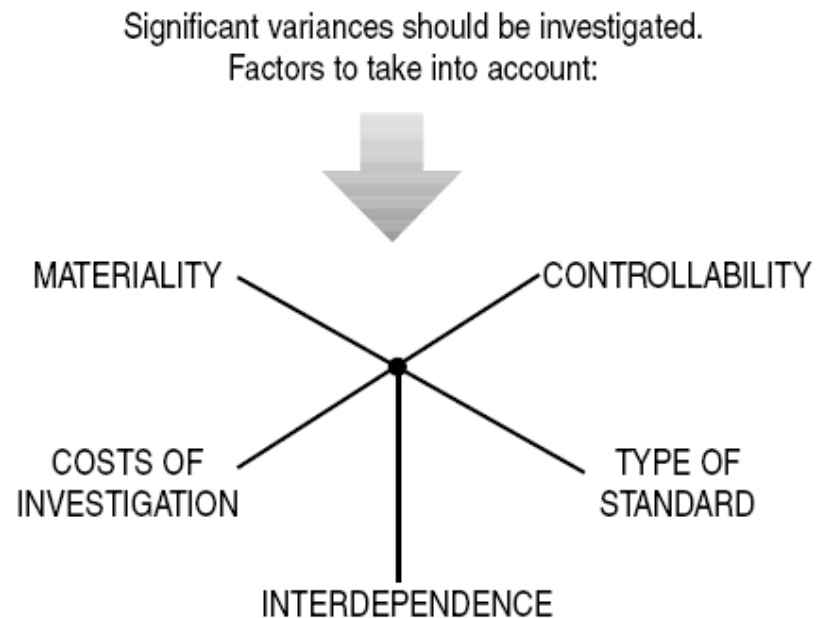
#### Adverse

- Lack of training
- Sub-std material

## Interdependence

The cause of one variance (adverse) might be wholly or partly explained by the cause of another favourable variance.

- Material price and usage variances
- Material price and labour efficiency variances
- Labour rate and efficiency variances



## 16: Further variance analysis

### Topic List

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Sales variances

---

Operating statements

---

Marginal versus absorption

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*The objective of cost variance analysis is to assist management in the control of costs. Costs are, however, only one of the factors which contribute to the achievement of planned profit. Sales are another important factor and sales variances can be calculated to aid management's control of their business.*

*Variances can be presented to management in operating statements.*

## Selling price variance

is a measure of the effect on expected profit of a different selling price to standard selling price.

## Example

The standard selling price of product H is \$15. Actual sales in 2001 were 2,000 units at \$15.30 per unit. Budgeted sales were 2,200 units and standard full cost per unit of H is \$12.30.

## Sales volume profit variance

is the difference between actual units sold and the budgeted quantity, valued at the standard profit per unit.

### Selling price variance

Sales revenue from 2,000 units  
should have been (× \$15)  
but was (× \$15.30)  
Selling price variance

\$
30,000
30,600
<u>600 (F)</u>

Favourable variance because the price was higher than expected

### Sales volume profit variance

Budgeted sales volume	2,200
Actual sales volume	<u>2,000</u>
	200 (A)
× standard profit per unit (\$15 – \$12.30)	× \$2.70
Sales volume profit variance	<u>540 (A)</u>

Adverse variance because actual sales were less than budgeted





An operating statement is a regular report for management of actual cost and revenues, as appropriate. It will usually compare actual with budget to show variances.

## OPERATING STATEMENT

		\$	\$
Budgeted profit before sales and administration costs			X
Sales variances	– price	X	
	– volume	<u>X</u>	
			<u>X</u>
Actual sales minus standard cost of sales			X
<i>Cost variances</i>		\$	\$
	(F)	(A)	
Material price	X		
Material usage etc		X	
	<u>X</u>	<u>X</u>	
Sales and administration costs			X
Actual profit			<u>X</u>



If an organisation uses standard marginal costing instead of standard absorption costing, there will be two differences in the way variances are calculated.

- 1 In a standard marginal costing system, there will be no fixed overhead volume variance
- 2 Sales volume variance  Absorption costing, valued at standard profit margin  
 Marginal costing valued at standard contribution margin
- 3 Operating statement  Absorption costing begins with budgeted profit  
 Marginal costing begins with budgeted contribution

One way in which the examiner can test your understanding of variance analysis is to provide information about variances from which you have to 'work backwards' to determine the actual results. You need to take an algebraic approach.

## 17: Cost-volume-profit (CVP) analysis

### Topic List

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Terms and formulae

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Breakeven chart

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Contribution chart

---

Profit/volume chart

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*CVP analysis enables management to predict how changes in volume (production output and sales) will impact upon costs and revenues and hence profitability.*

Terms and  
formulae

Breakeven chart

Contribution  
chart

Profit/volume  
chart

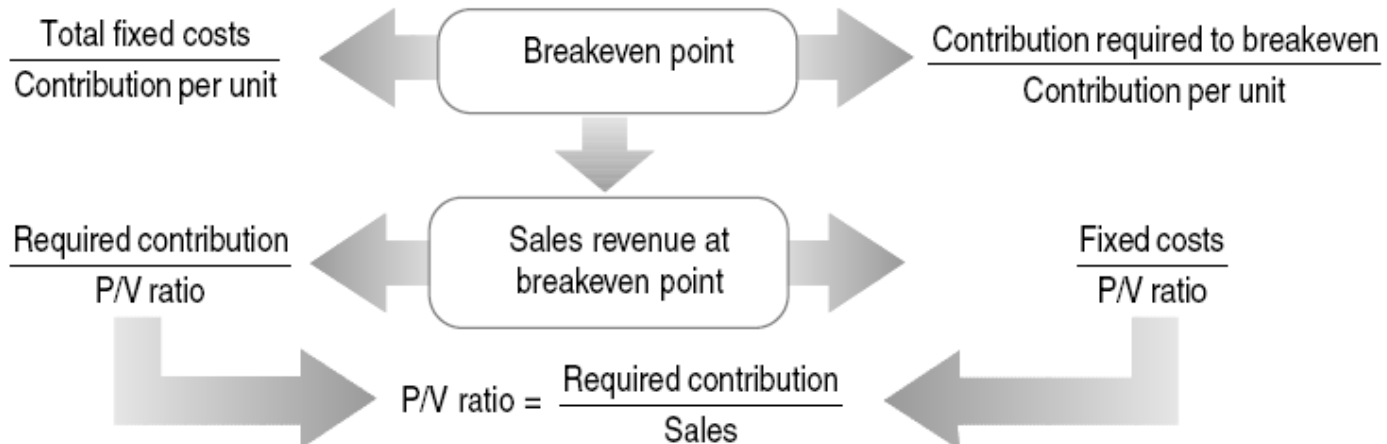
## Contribution per unit

is unit selling price – unit variable costs

## Profit

is (sales volume × contribution per unit) – fixed costs

**Breakeven point is activity level at which there is neither profit nor loss.**



The margin of safety is the difference in units between the budgeted sales volume and the breakeven sales volume and it is sometimes expressed as a percentage of the budgeted sales volume.

The sales volume to achieve a target profit =  $\frac{\text{Fixed costs} + \text{target profit}}{\text{Contribution per unit}}$

- Breakeven point (units) =  $\frac{\$5,400}{\$15 - \$12} = 1,800 \text{ units}$

- P/V ratio =  $\frac{3}{15} \times 100\% = 20\% = 0.2$

- Breakeven point (revenue) =  $\frac{5,400}{0.2} = \$27,000$

- Sales volume to achieve profit of \$3,300 =  $\frac{\$(5,400 + 3,300)}{\$3} = 2,900 \text{ units}$

- Margin of safety (as a %) =  $\frac{3,000 - 1,800}{3,000} \times 100\% = 40\%$

### Example

Selling price = \$15 per unit

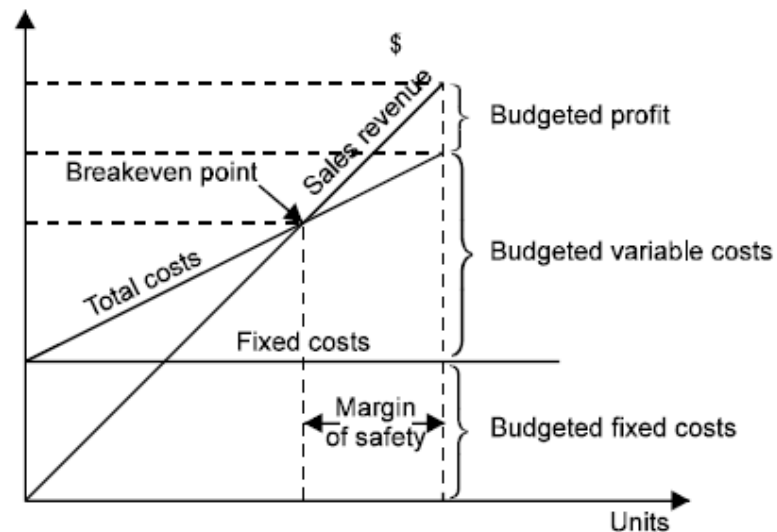
Variable cost = \$12 per unit

Fixed costs = \$5,400 per annum

Budgeted sales pa = 3,000 units

## Breakeven chart

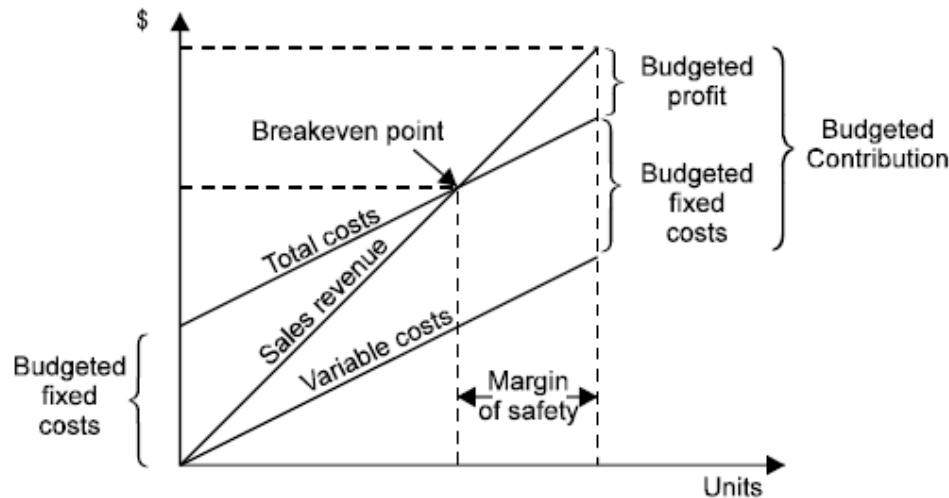
Shows the approximate level of profit or loss at different sales volume levels within a limited range.



- Profit/loss is the difference between the sales revenue line and the total costs line
- The breakeven point is where the total costs line and the sales revenue line meet

## Contribution chart

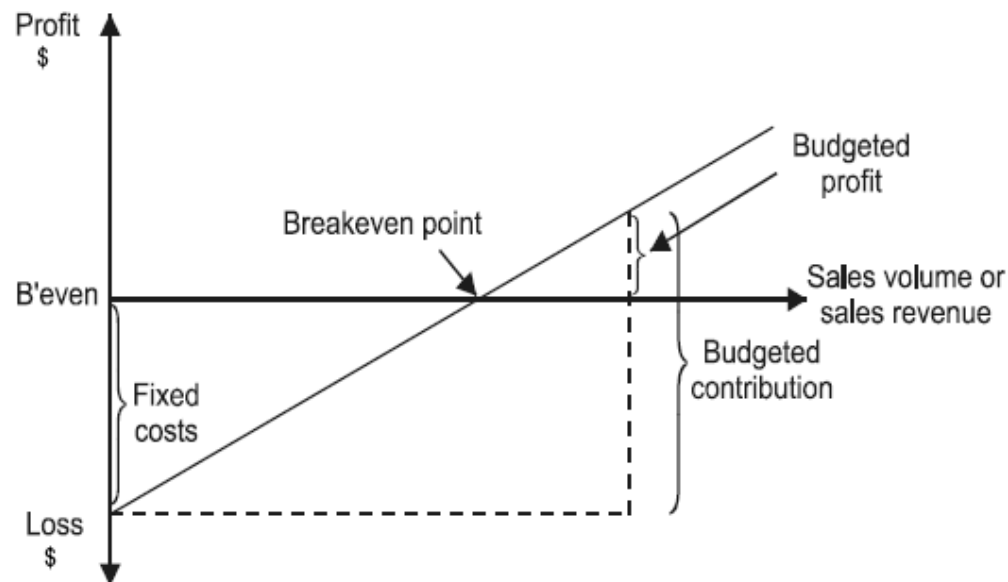
Draw the variable costs line instead of the fixed costs line.



- This type of chart shows clearly the contribution for different levels of production
- At the breakeven point, contribution = fixed costs
- Contribution = Sales revenue line – variable costs line

## Profit/volume chart

Variation of the breakeven chart. It illustrates the relationship of costs and profit to sales and the margin of safety.



- If the x axis is sales units, the gradient of the straight line is the contribution per unit
- If the x axis is sales value, the gradient of the straight line is the P/V ratio
- This type of chart shows clearly the effect on profit and breakeven point of changes in SP, VC, FC and/or sales demand

## 18: Relevant costing and decision making

### Topic List

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Relevant costs

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Product mix decisions

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*Management at all levels within an organisation take decisions. The overriding requirement of the information that should be supplied by the cost accountant to aid decision making is relevance.*

- *A relevant cost is a future cash flow arising as a direct consequence of a decision*
- *All relevant costs are future, incremental cashflows*



## Avoidable cost

is a cost which would not be incurred if the activity to which it related did not exist.

## Opportunity cost

is the benefit which would have been earned but which has been given up, by choosing one option instead of another.

Relevant costs

## Differential cost

is the difference in the cost of alternatives.

## Controllable cost

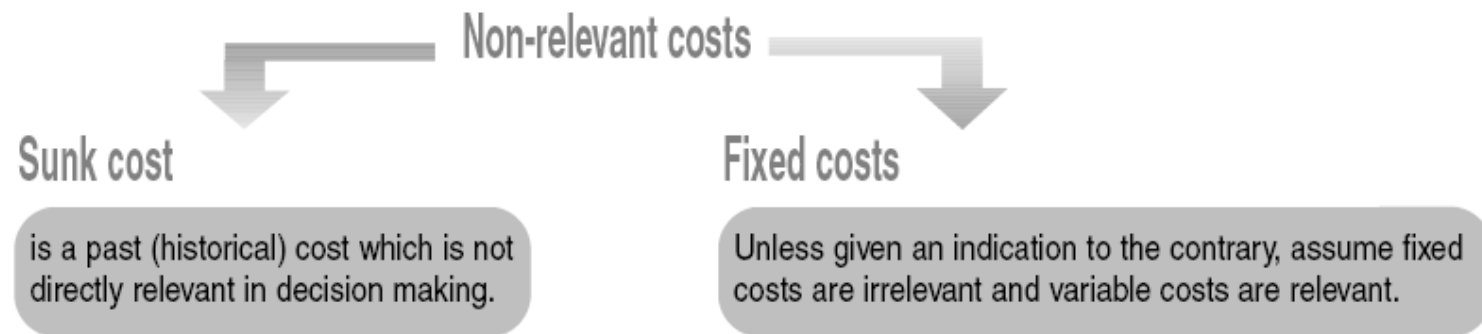
is an item of expenditure which can be directly influenced by a given manager within a given time span.

## Relevant cost of materials

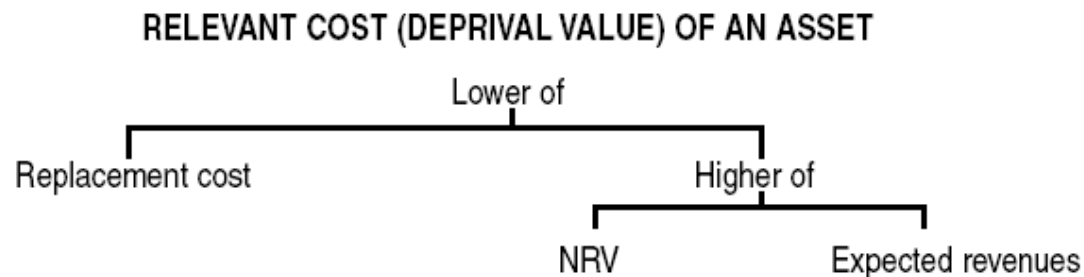
- Not owned — current replacement cost
- Owned —
  - will be replaced
  - will not be replaced —
    - higher of current resale value and value if put to an alternative use

## Relevant cost of labour

- Direct labour cost plus contribution lost by diverting labour to make another product



Direct and indirect costs may be relevant or irrelevant depending on the situation.



If there is a scarce resource (key or limiting factor), contribution will be maximised by earning the biggest possible contribution per unit of scarce resource.

Assume fixed costs remain unchanged, whatever the product mix

Assume the only relevant costs are variable costs

### Example

	T	J
	\$	\$
Direct labour (\$5 per hour)	15	10
Direct materials (\$2 per kg)	2	5
Variable overheads	2	2
Fixed overheads	3	3
	<u>22</u>	<u>20</u>
Selling price	\$25	\$24
Maximum demand	10,000	8,000
Maximum availability of labour	40,000 hours	

**Step 1.** Confirm limiting factor is not sales

Labour hours required to fulfil demand =  $(10,000 \times 3) + (8,000 \times 2) = 46,000$

$\therefore$  shortfall =  $46,000 - 40,000 = 6,000$  hours

**Step 2.** Calculate the contribution per unit of scarce resource

	T	J
Unit contribution	\$6 (25 – 19)	\$7 (24 – 17)
Labour hours per unit	3	2
Contribution per labour hour	\$2	\$3.50
Rank	2nd	1st

**Step 3.** Work out budgeted production and sales

<i>Product</i>		<i>Hours</i>		<i>Production</i>	<i>Contribution per unit \$</i>	<i>Total contribution</i>
J	(8,000 × 2)	16,000	(÷ 2)	8,000	7	56,000
T	Balance	24,000	(÷ 3)	8,000	6	48,000
		<u>40,000</u>				<u>104,000</u>

## 19: Linear programming

### Topic List

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Formulating the problem

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Finding the solution

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*A typical business problem is to decide how a company should divide up its production among the various types of product that it manufactures in order to obtain the maximum possible profit. A business cannot simply aim to produce as much as possible because there will be limitations or constraints.*

*Linear programming is a technique for allocating scarce resources so as to maximise profit or minimise costs.*

### Example

A company makes two products, standard and deluxe.  
Relevant data are as follows.

	<i>Standard</i>	<i>Deluxe</i>	<i>Availability per month</i>
Profit per unit	£15	£20	
Labour hours per unit	5	10	4,000
Kgs of material per unit	10	5	4,250

#### Step 1. Define variables



- Let  $x$  = number of standards produced each month
- Let  $y$  = number of deluxes produced each month

#### Step 2. Establish constraints



- Labour  $5x + 10y \leq 4,000$
- Material  $10x + 5y \leq 4,250$
- Non-negativity  $x \geq 0, y \geq 0$

#### Step 3. Establish objective function

- Profit ( $P$ ) =  $15x + 20y$

Students often have problems with constraints of the style 'the quantity of one type must not exceed twice that of the other.' This can be interpreted as follows: the quantity of one type (say  $x$ ) must not exceed (must be less than or equal to) twice that of the other ( $2y$ ), ie  $x \leq 2y$ .

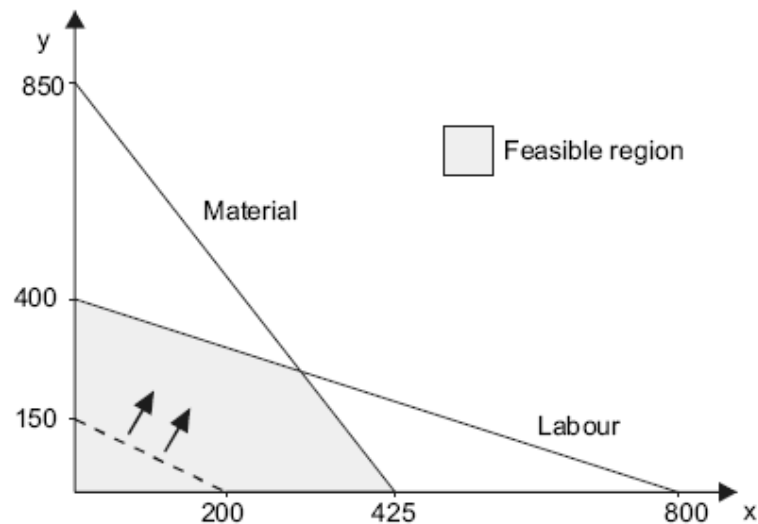
There are two methods you need to know about when finding the solution to a linear programming problem

- Graphical method
- Using equations

## Graphical method

**Step 1.** Graph the constraints

Labour  $5x + 10y = 4,000$   
if  $x = 0, y = 400$   
if  $y = 0, x = 800$   
  
Material  $10x + 5y = 4,250$   
if  $x = 0, y = 850$   
if  $y = 0, x = 425$



**Step 2.** Establish the feasible area/region

This is the area where all inequalities are satisfied (area above x axis and y axis ( $x \geq 0$ ,  $y \geq 0$ ), below material constraint ( $\leq$ ) and below labour constraint ( $\leq$ ))

**Step 3.** Add an iso-profit line

Suppose  $P = \text{£}3,000$  so that if  $P = 15x + 20y$  then if  $x = 0$ ,  $y = 150$  and if  $y = 0$ ,  $x = 200$  and (sliding your ruler across the page if necessary) find the point furthest from the origin but still in the feasible area

**Step 4.** Use simultaneous equations to find the x and y coordinates at the optimal solution, the intersection of the material and labour constraints ( $x = 300$ ,  $y = 250$ )

If the objective were to minimise costs, the optimal solution would be the point in the feasible area closest to the origin.

**Using equations**

- Graph constraints and establish feasible area
- Determine all possible intersection points of constraints and axes using simultaneous equations
- Calculate profit at each intersection point to determine which is the optimal solution